



# Shell Turbo T 46

## High Quality Industrial Steam & Gas Turbine Oils

Shell Turbo Oils T have long been regarded as the industry standard turbine oil. Building on this reputation, Shell Turbo Oils T have been developed to offer improved performance capable of meeting the demands of the most modern steam turbine systems and light duty gas turbines, which require no enhanced anti-wear performance for the gearbox. Shell Turbo Oils T are formulated from high quality hydrotreated base oils and a combination of zinc-free additives that provide excellent oxidative stability, protection against rust & corrosion, low foaming and excellent demulsibility.

### DESIGNED TO MEET CHALLENGES

#### Performance, Features & Benefits

##### ■ Strong Control of Oxidation

The use of inherently oxidatively stable base oils together with an effective inhibitor package provides high resistance to oxidative degradation. The result is extended oil life, minimising the formation of aggressive corrosive acids, deposits and sludge, reducing your operating costs.

##### ■ High Resistance to Foaming and Rapid Air Release

The oils are formulated with a non-silicone anti-foam additive, which generally controls foam formation. This feature coupled with fast air-release from the lubricant reduces the possibility of problems such as pump cavitation, excessive wear and premature oil oxidation, giving you increased system reliability.

##### ■ Positive Water-shedding properties

Robust demulsibility control such that excess water, commonplace in steam turbines, can be drained easily from the lubrication system, minimising corrosion and premature wear. Lowering the risk of unplanned maintenance.

##### ■ Excellent Rust & Corrosion Protection

Prevents the formation of rust and guards against onset of corrosion ensuring protection for equipment following exposure to humidity or water during operation and during shut-downs, minimising maintenance.

##### ■ Resistant to reaction with ammonia

The use of highly refined base oils and specific additives, resistant to attack by ammonia, minimises the possibility of damaging oil soluble/insoluble ammonia compounds being formed in the lubricant. Shell Turbo Oils T mitigates the formation of these deposits, which could impair the reliable operation of bearings and seal oil systems.

#### Main Applications

Shell Turbo Oils T are available in ISO grades 32, 46, 68 & 100 suited for application in the following areas:

Industrial steam turbines & light duty gas turbines which require no enhanced anti-wear performance for the gearbox

Water turbine lubrication

Compressor applications

- Numerous applications where strong control over rust and oxidation is required

#### Specifications, Approvals & Recommendations

Siemens Power Generation TLV 9013 04 & TLV 9013 05

- Alstom Power Turbo-Systems HTGD 90-117
- Man Turbo SP 079984 D0000 E99
- Cincinnati Approvals: P-38: Turbo T 32, P-55: Turbo T 46, P-54: Turbo T 68
- General Electric GEK 28143b – Type I (ISO 32), GEK 28143b – Type II (ISO 46), 46506E
- Siemens - Westinghouse 21T0591 & PD-55125Z3
- DIN 51515 Part 1 & 2
- ISO 8068
- Solar ES 9-224W Class II
- GEC Alstom NBA P50001
- JIS K2213 Type 2
- BS 489-1999
- ASTM D4304, Type I
- Skoda : Technical Properties Tp 0010P/97 use in steam engines.

For a full listing of equipment approvals and recommendations, please consult your local Shell Technical Helpdesk, or the OEM Approvals website.

## Typical Physical Characteristics

Properties			Method	Shell Turbo Oil T
Viscosity	@40°C	cSt	ASTM D 445	46
Viscosity	@100°C	cSt	ASTM D 445	6.6
Colour			ASTM D 1500	L 0.5
Pour Point		°C	ASTM D 97	<-12
Flash Point (COC)		°C	ASTM D 92	220
Total Acid Number		mg KOH/g	ASTM D 974	0.05
Foaming - Seq I		ml/ml	ASTM D 892	30/Nil
Foaming - Seq II		ml/ml	ASTM D 892	20/Nil
Foaming - Seq III		ml/ml	ASTM D 892	30/Nil
Air Release, Minutes		min	ASTM D 3427	4
Water Demulsibility		min	ASTM D 1401	15
Steam Demulsibility		secs	DIN 51589	153
Copper Corrosion (3 hrs)	@100°C		ASTM D 130	1b
Rust Control, after water washing			ASTM D 665B	Pass
Inertness to Ammonia			Modified ASTM D 943	0.04
Acid Number		mg KOH/g		0.004
Organic Sludge		%		0
Copper Content (ppm)				-
FZG, Fail Load Stage			DIN 51354	7
Oxidation Control Test - TOST Life		hrs	Modified ASTM D 943	>10,000
Oxidation Control Test - TOST 1000hr Sludge		mg	ASTM D 4310	30
Oxidation Control Test - RPVOT - minutes		min	ASTM D 2272	>950

These characteristics are typical of current production. Whilst future production will conform to Shell's specification, variations in these characteristics may occur.

### Health, Safety & Environment

- Guidance on Health and Safety is available on the appropriate Material Safety Data Sheet, which can be obtained from <http://www.epc.shell.com/>

#### Protect the Environment

Take used oil to an authorised collection point. Do not discharge into drains, soil or water.

### Additional Information

#### Advice

Advice on applications not covered here may be obtained from your Shell representative.